Name:

at1124exam: Radicals and Squares (v907)

Question 1

Simplify the radical expressions.

$\sqrt{99}$	$\sqrt{63}$	$\sqrt{28}$
$\sqrt{3 \cdot 3 \cdot 11}$	$\sqrt{3 \cdot 3 \cdot 7}$	$\sqrt{2 \cdot 2 \cdot 7}$
$3\sqrt{11}$	$3\sqrt{7}$	$2\sqrt{7}$

Question 2

Find all solutions to the equation below:

$$2\left((x+6)^2 - 8\right) \;=\; 82$$

First, divide both sides by 2.

$$(x+6)^2 - 8 = 41$$

Then, add 8 to both sides.

$$(x+6)^2 = 49$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 6 = \pm 7$$

Subtract 6 from both sides.

$$x = -6 \pm 7$$

So the two solutions are $x = 1$ and $x = -13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 10x = 39$$

$$x^2 - 10x + 25 = 39 + 25$$
$$x^2 - 10x + 25 = 64$$
$$(x-5)^2 = 64$$
$$x - 5 = \pm 8$$
$$x = 5 \pm 8$$
$$x = 13 \quad \text{or} \quad x = -3$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 4x^2 - 40x + 92$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 - 10x) + 92$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 - 10x + 25 - 25) + 92$$

Factor the perfect-square trinomial.

$$y = 4((x-5)^2 - 25) + 92$$

Distribute the 4.

$$y = 4(x-5)^2 - 100 + 92$$

Combine the constants to get **vertex form**:

$$y = 4(x-5)^2 - 8$$

The vertex is at point $(5, -8)$.